

ABSTRACT

A method of making a MOS transistor is disclosed. The disclosed techniques can completely transform a polysilicon gate electrode into a metal silicide electrode through a brief thermal treatment process by extending the contact area between the polysilicide gate electrode and a metal layer prior to a formation of a metal silicide. The disclosed MOS transistor fabricating method comprises providing a semiconductor substrate further comprising a polysilicon gate electrode with a silicide layer thereon, a spacer, and source and drain regions with LDD regions; forming an insulating layer on the area of the substrate; polishing the insulating layer so that the top of the polysilicon gate electrode can be exposed; etching some part of the insulating layer and the spacer so that both lateral walls of the polysilicon gate electrode can be exposed; forming a metal layer on the substrate resulted from the preceding step so that the polysilicon gate electrode can be covered with the metal layer; and transforming completely the polysilicon gate electrode into a metal silicide gate electrode by performing a thermal treatment process.